

SEQUENCE LISTING

<110> Hallahan, David
Keiper-Hrynko, Natalie

<120> Genes Involved in the Biosynthesis of Isopentenyl Diphosphate in
Hevea brasiliensis Latex

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<150> 60/307,637

<151> 2001-07-25

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<212> DNA

<213> Hevea brasiliensis

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<213> Hevea brasiliensis

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<212> DNA

<213> Hevea brasiliensis

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<212> DNA

<213> Hevea brasiliensis

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<212> DNA

<213> Hevea brasiliensis

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<212> DNA

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<210> 8

<211> 411

<212> PRT

<213> Hevea brasiliensis

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Gly	Ala	Gly	Ile	Pro	Asn	Ser	Val	Ile	Cys	Thr	Thr	Ile	Asn	Lys	Val
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Tyr	Tyr	Glu	Ile	Asn	Glu	Ala	Phe	Ser	Val	Val	Ala	Leu	Ala	Asn	Gln
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Thr Leu Leu Gly Val Leu Arg His Lys Asn Gly Lys Tyr Gly Val Ala
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<210> 9

<211> 464

<212> PRT

<213> Hevea brasiliensis

<400> 9

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35 40 45

Glu Val Glu Asp Val Ile Ser Met Ser Leu Thr Ala Val Thr Ser Leu
50 55 60

Leu Asp Lys Tyr Asn Ile Asp Pro Lys Gln Ile Gly Arg Leu Glu Val
65 70 75 80

Gly Ser Glu Thr Val Ile Asp Lys Ser Lys Ser Ile Lys Thr Phe Leu
85 90 95

Met Gln Ile Phe Glu Lys Phe Gly Asn Thr Asp Ile Glu Gly Val Asp
100 105 110

Ser Thr Asn Ala Cys Tyr Gly Gly Thr Ala Ala Leu Phe Asn Cys Val
115 120 125

Asn Trp Val Glu Ser Ser Ser Trp Asp Gly Arg Tyr Gly Leu Val Val
130 135 140

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165 170 175

Phe Glu Ser Lys Phe Arg Gly Ser His Met Ser His Ala Tyr Asp Phe
180 185 190

Tyr Lys Pro Asn Leu Ala Ser Glu Tyr Pro Val Val Asp Gly Lys Leu
195 200 205

Ser Gln Thr Cys Tyr Leu Met Ala Leu Asp Ser Cys Tyr Lys His Phe
210 215 220

Cys Ala Lys Tyr Glu Lys Phe Glu Gly Lys Gln Phe Ser Ile Ser Asp
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 Ala Glu Tyr Phe Val Phe His Ser Pro Tyr Asn Lys Leu Val Gln Lys
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 Ser Phe Ala Arg Leu Val Phe Asn Asp Phe Val Arg Asn Ala Ser Ser
 260 265 270
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 275 280 285
 Gly Asp Glu Ser Tyr Gln Asn Arg Asp Leu Glu Lys Val Ser Gln Gln
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 Val Ala Lys Pro Leu Tyr Asp Ala Lys Val Lys Pro Thr Thr Leu Ile
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 325 330 335
 Ala Ser Leu Leu His Ser Lys His Thr Glu Leu Ala Gly Lys Arg Val
 340 345 350
 Thr Leu Phe Ser Tyr Gly Ser Gly Leu Thr Ala Thr Met Phe Ser Leu
 355 360 365
 Arg Leu His Glu Gly Gln His Pro Phe Ser Leu Ser Asn Ile Ala Ser
 370 375 380
 Val Met Asn Val Ala Gly Lys Leu Lys Ala Arg His Glu Leu Pro Pro
 385 390 395 400
 Glu Lys Phe Val Asp Ile Met Lys Leu Met Glu His Arg Tyr Gly Ala
 405 410 415
 Lys Asp Phe Val Thr Ser Lys Asp Cys Ser Leu Leu Ala Ser Gly Thr
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 Tyr Tyr Leu Thr Glu Val Asp Ser Leu Tyr Arg Arg Phe Tyr Ala Gln
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<210> 10

<211> 575

<212> PRT

<213> Hevea brasiliensis

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1003699-010002

Pro Leu Tyr Leu Thr Asn Ala Val Phe Phe Thr Leu Phe Phe Ser Val
35 40 45

Ala Tyr Tyr Leu Leu His Arg Trp Arg Asp Lys Ile Arg Asn Ser Thr
50 55 60

Pro Leu His Ile Val Thr Leu Ser Glu Ile Val Ala Ile Val Ser Leu
65 70 75 80

Ile Ala Ser Phe Ile Tyr Leu Leu Gly Phe Phe Gly Ile Asp Phe Val
85 90 95

Gln Ser Phe Ile Ala Arg Ala Ser His Asp Val Trp Asp Leu Glu Asp
100 105 110

Thr Asp Pro Asn Tyr Leu Ile Asp Glu Asp His Arg Leu Val Thr Cys
115 120 125

Pro Pro Ala Asn Ile Ser Thr Lys Thr Thr Ile Ile Ala Ala Pro Thr
130 135 140

Lys Leu Pro Thr Ser Glu Pro Leu Ile Ala Pro Leu Val Ser Glu Glu
145 150 155 160

Asp Glu Met Ile Val Asn Ser Val Val Asp Gly Lys Ile Pro Ser Tyr
165 170 175

Ser Leu Glu Ser Lys Leu Gly Asp Cys Lys Arg Ala Ala Ala Ile Arg
180 185 190

Arg Glu Ala Leu Gln Arg Met Thr Arg Arg Ser Leu Glu Gly Leu Pro
195 200 205

Val Glu Gly Phe Asp Tyr Glu Ser Ile Leu Gly Gln Cys Cys Glu Met
210 215 220

Pro Val Gly Tyr Val Gln Ile Pro Val Gly Ile Ala Gly Pro Leu Leu
225 230 235 240

Leu Asn Gly Arg Glu Tyr Ser Val Pro Met Ala Thr Thr Glu Gly Cys
245 250 255

Leu Val Ala Ser Thr Asn Arg Gly Cys Lys Ala Ile Tyr Leu Ser Gly
260 265 270

Gly Ala Thr Ser Val Leu Leu Lys Asp Gly Met Thr Arg Ala Pro Val
275 280 285

Val Arg Phe Ala Ser Ala Thr Arg Ala Ala Glu Leu Lys Phe Phe Leu
290 295 300

Glu Asp Pro Asp Asn Phe Asp Thr Leu Ala Val Val Phe Asn Lys Ser
305 310 315 320

Ser Arg Phe Ala Arg Leu Gln Gly Ile Lys Cys Ser Ile Ala Gly Lys
325 330 335

Asn Leu Tyr Ile Arg Phe Ser Cys Ser Thr Gly Asp Ala Met Gly Met
340 345 350

Asn Met Val Ser Lys Gly Val Gln Asn Val Leu Glu Phe Leu Gln Ser
355 360 365

Asp Phe Ser Asp Met Asp Val Ile Gly Ile Ser Gly Asn Phe Cys Ser
370 375 380

Asp Lys Lys Pro Ala Ala Val Asn Trp Ile Glu Gly Arg Gly Lys Ser
385 390 395 400

Val Val Cys Glu Ala Ile Ile Lys Glu Glu Val Val Lys Lys Val Leu
405 410 415

Lys Thr Asn Val Ala Ser Leu Val Glu Leu Asn Met Leu Lys Asn Leu
420 425 430

Ala Gly Ser Ala Val Ala Gly Ala Leu Gly Gly Phe Asn Ala His Ala
435 440 445

Gly Asn Ile Val Ser Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala
450 455 460

Gln Asn Val Glu Ser Ser His Cys Ile Thr Met Met Glu Ala Val Asn
465 470 475 480

Asp Gly Lys Asp Leu His Ile Ser Val Thr Met Pro Ser Ile Glu Val
485 490 495

Gly Thr Val Gly Gly Gly Thr Gln Leu Ala Ser Gln Ser Ala Cys Leu
500 505 510

Asn Leu Leu Gly Val Lys Gly Ala Asn Lys Glu Ser Pro Gly Ser Asn
515 520 525

Ser Arg Leu Leu Ala Ala Ile Val Ala Gly Ser Val Leu Ala Gly Glu
530 535 540

Leu Ser Leu Met Ser Ala Ile Ala Ala Gly Gln Leu Val Lys Ser His
545 550 555 560

Met Lys Tyr Asn Arg Ser Ser Lys Asp Met Ser Lys Ala Ala Ser
565 570 575

<210> 11

<211> 386

<212> PRT

<213> Hevea brasiliensis

<400> 11

Met Glu Val Lys Ala Arg Ala Pro Gly Lys Ile Ile Leu Ser Gly Glu
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His Ala Val Val His Gly Ser Thr Ala Val Ala Ala Ser Ile Asn Leu
20 25 30

Tyr Thr Tyr Val Thr Leu Ser Phe Ala Thr Ala Glu Asn Asp Asp Ser
35 40 45

Leu Lys Leu Gln Leu Lys Asp Leu Ala Leu Glu Phe Ser Trp Pro Ile
50 55 60

Gly Arg Ile Arg Glu Ala Leu Ser Asn Leu Gly Ala Pro Ser Ser Ser
 65 70 75 80
 Thr Arg Thr Ser Cys Ser Met Glu Ser Ile Lys Thr Ile Ser Ala Leu
 85 90 95
 Val Glu Glu Glu Asn Ile Pro Glu Ala Lys Ile Ala Leu Thr Ser Gly
 100 105 110
 Val Ser Ala Phe Leu Trp Leu Tyr Thr Ser Ile Gln Gly Phe Lys Pro
 115 120 125
 Ala Thr Val Val Val Thr Ser Asp Leu Pro Leu Gly Ser Gly Leu Gly
 130 135 140
 Ser Ser Ala Ala Phe Cys Val Ala Leu Ser Ala Ala Leu Leu Ala Phe
 145 150 155 160
 Ser Asp Ser Val Asn Val Asp Thr Lys His Leu Gly Trp Ser Ile Phe
 165 170 175
 Gly Glu Ser Asp Leu Glu Leu Leu Asn Lys Trp Ala Leu Glu Gly Glu
 180 185 190
 Lys Ile Ile His Gly Lys Pro Ser Gly Ile Asp Asn Thr Val Ser Ala
 195 200 205
 Tyr Gly Asn Met Ile Lys Phe Lys Ser Gly Asn Leu Thr Arg Ile Lys
 210 215 220
 Ser Asn Met Pro Leu Lys Met Leu Val Thr Asn Thr Arg Val Gly Arg
 225 230 235 240
 Asn Thr Lys Ala Leu Val Ala Gly Val Ser Glu Arg Thr Leu Arg His
 245 250 255
 Pro Asn Ala Met Ser Phe Val Phe Asn Ala Val Asp Ser Ile Ser Asn
 260 265 270
 Glu Leu Ala Asn Ile Ile Gln Ser Pro Ala Pro Asp Asp Val Ser Ile
 275 280 285
 Thr Glu Lys Glu Glu Lys Leu Glu Glu Leu Met Glu Met Asn Gln Gly
 290 295 300
 Leu Leu Gln Cys Met Gly Val Ser His Ala Ser Ile Glu Thr Val Leu
 305 310 315 320
 Arg Thr Thr Leu Lys Tyr Lys Leu Ala Ser Lys Leu Thr Gly Ala Gly
 325 330 335
 Gly Gly Gly Cys Val Leu Thr Leu Leu Pro Thr Leu Leu Ser Gly Thr
 340 345 350
 Val Val Asp Lys Ala Ile Ala Glu Leu Glu Ser Cys Gly Phe Gln Cys
 355 360 365
 Leu Ile Ala Gly Ile Gly Gly Asn Gly Val Glu Phe Cys Phe Gly Gly
 370 375 380
 Ser Ser
 385

<210> 12
 <211> 503
 <212> PRT
 <213> Hevea brasiliensis

<400> 12

Met	Ala	Val	Val	Ala	Ser	Ala	Pro	Gly	Lys	Val	Leu	Met	Thr	Gly	Gly
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Tyr	Leu	Ile	Leu	Glu	Arg	Pro	Asn	Ala	Gly	Ile	Val	Leu	Ser	Thr	Asn
			20					25					30		
Ala	Arg	Phe	Tyr	Ala	Ile	Val	Lys	Pro	Ile	Tyr	Asp	Glu	Ile	Lys	Pro
		35					40					45			
Asp	Ser	Trp	Ala	Trp	Ala	Trp	Thr	Asp	Val	Lys	Leu	Thr	Ser	Pro	Gln
	50					55					60				
Leu	Ala	Arg	Glu	Ser	Leu	Tyr	Lys	Leu	Ser	Leu	Lys	Asn	Leu	Ala	Leu
65					70					75					80
Gln	Cys	Val	Ser	Ser	Ser	Ala	Ser	Arg	Asn	Pro	Phe	Val	Glu	Gln	Ala
				85					90					95	
Val	Gln	Phe	Ala	Val	Ala	Ala	Ala	His	Ala	Thr	Leu	Asp	Lys	Asp	Lys
			100					105					110		
Lys	Asn	Val	Leu	Asn	Lys	Leu	Leu	Leu	Gln	Gly	Leu	Asp	Ile	Thr	Ile
		115					120					125			
Leu	Gly	Thr	Asn	Asp	Phe	Tyr	Ser	Tyr	Arg	Asn	Glu	Ile	Glu	Ala	Cys
	130					135					140				
Gly	Leu	Pro	Leu	Thr	Pro	Glu	Ser	Leu	Ala	Ala	Leu	Pro	Ser	Phe	Ser
145					150					155					160
Ser	Ile	Thr	Phe	Asn	Val	Glu	Glu	Ala	Asn	Gly	Gln	Asn	Cys	Lys	Pro
				165					170					175	
Glu	Val	Ala	Lys	Thr	Gly	Leu	Gly	Ser	Ser	Ala	Ala	Met	Thr	Thr	Ala
			180					185					190		
Val	Val	Ala	Ala	Leu	Leu	His	His	Leu	Gly	Leu	Val	Asp	Leu	Ser	Ser
		195					200					205			
Ser	Cys	Lys	Glu	Lys	Lys	Phe	Ser	Asp	Leu	Asp	Leu	Val	His	Ile	Ile
	210					215					220				
Ala	Gln	Thr	Ala	His	Cys	Ile	Ala	Gln	Gly	Lys	Val	Gly	Ser	Gly	Phe
225					230					235					240
Asp	Val	Ser	Ser	Ala	Val	Tyr	Gly	Ser	His	Arg	Tyr	Val	Arg	Phe	Ser
				245					250					255	
Pro	Glu	Val	Leu	Ser	Ser	Ala	Gln	Asp	Ala	Gly	Lys	Gly	Ile	Pro	Leu
			260					265					270		

Gln Glu Val Ile Ser Asn Ile Leu Lys Gly Lys Trp Asp His Glu Arg
275 280 285

Thr Met Phe Ser Leu Pro Pro Leu Met Ser Leu Leu Leu Gly Glu Pro
290 295 300

Gly Thr Gly Gly Ser Ser Thr Pro Ser Met Val Gly Ala Leu Lys Lys
305 310 315 320

Trp Gln Lys Ser Asp Thr Gln Lys Ser Gln Glu Thr Trp Arg Lys Leu
325 330 335

Ser Glu Ala Asn Ser Ala Leu Glu Thr Gln Phe Asn Ile Leu Ser Lys
340 345 350

Leu Ala Glu Glu His Trp Asp Ala Tyr Lys Cys Val Ile Asp Ser Cys
355 360 365

Ser Thr Lys Asn Ser Glu Lys Trp Ile Glu Gln Ala Thr Glu Pro Ser
370 375 380

Arg Glu Ala Val Val Lys Ala Leu Leu Gly Ser Arg Asn Ala Met Leu
385 390 395 400

Gln Ile Arg Asn Tyr Met Arg Gln Met Gly Glu Ala Ala Gly Val Pro
405 410 415

Ile Glu Pro Glu Ser Gln Thr Arg Leu Leu Asp Thr Thr Met Asn Met
420 425 430

Asp Gly Val Leu Leu Ala Gly Val Pro Gly Ala Gly Gly Phe Asp Ala
435 440 445

Val Phe Ala Val Thr Leu Gly Asp Ser Gly Thr Asn Val Ala Lys Ala
450 455 460

Trp Ser Ser Leu Asn Val Leu Ala Leu Leu Val Arg Glu Asp Pro Asn
465 470 475 480

Gly Val Leu Leu Glu Ser Gly Asp Pro Arg Thr Lys Glu Ile Thr Thr
485 490 495

Ala Val Phe Ala Val His Ile
500

<210> 13

<211> 415

<212> PRT

<213> Hevea brasiliensis

<400> 13

Met Ala Glu Ser Trp Val Ile Met Val Thr Ala Gln Thr Pro Thr Asn
1 5 10 15

Ile Ala Val Ile Lys Tyr Trp Gly Lys Arg Asp Glu Lys Leu Ile Leu
20 25 30

Pro Val Asn Asp Ser Ile Ser Val Thr Leu Asp Pro Ala His Leu Cys
35 40 45

Thr Thr Thr Thr Val Ala Val Ser Pro Ser Phe Ala Gln Asp Arg Met
50 55 60

Trp Leu Asn Gly Lys Glu Ile Ser Leu Ser Gly Gly Arg Tyr Gln Asn
65 70 75 80

Cys Leu Arg Glu Ile Arg Ala Arg Ala Cys Asp Val Glu Asp Lys Glu
85 90 95

Arg Gly Ile Lys Ile Ser Lys Lys Asp Trp Glu Lys Leu Tyr Val His
100 105 110

Ile Ala Ser Tyr Asn Asn Phe Pro Thr Ala Ala Gly Leu Ala Ser Ser
115 120 125

Ala Ala Gly Phe Ala Cys Leu Val Phe Ala Leu Ala Lys Leu Met Asn
130 135 140

Ala Lys Glu Asp Asn Ser Glu Leu Ser Ala Ile Ala Arg Gln Gly Ser
145 150 155 160

Gly Ser Ala Cys Arg Ser Leu Phe Gly Gly Phe Val Lys Trp Lys Met
165 170 175

Gly Lys Val Glu Asp Gly Ser Asp Ser Leu Ala Val Gln Val Val Asp
180 185 190

Glu Lys His Trp Asp Asp Leu Val Ile Ile Ile Ala Val Val Ser Ser
195 200 205

Arg Gln Lys Glu Thr Ser Ser Thr Thr Gly Met Arg Glu Thr Val Glu
210 215 220

Thr Ser Leu Leu Leu Gln His Arg Ala Lys Glu Ile Val Pro Lys Arg
225 230 235 240

Ile Val Gln Met Glu Glu Ser Ile Lys Asn Arg Asn Phe Ala Ser Phe
245 250 255

Ala His Leu Thr Cys Ala Asp Ser Asn Gln Phe His Ala Val Cys Met
260 265 270

Asp Thr Cys Pro Pro Ile Phe Tyr Met Asn Asp Thr Ser His Arg Ile
275 280 285

Ile Ser Cys Val Glu Lys Trp Asn Arg Ser Val Gly Thr Pro Gln Val
290 295 300

Ala Tyr Thr Phe Asp Ala Gly Pro Asn Ala Val Leu Ile Ala His Asn
305 310 315 320

Arg Lys Ala Ala Ala Gln Leu Leu Gln Lys Leu Leu Phe Tyr Phe Pro
325 330 335

Pro Asn Ser Asp Thr Glu Leu Asn Ser Tyr Val Leu Gly Asp Lys Ser
340 345 350

Ile Leu Lys Asp Ala Gly Ile Glu Asp Leu Lys Asp Val Glu Ala Leu
355 360 365

Pro Pro Pro Pro Glu Ile Lys Asp Ala Pro Arg Tyr Lys Gly Asp Val
370 375 380

Ser Tyr Phe Ile Cys Thr Arg Pro Gly Gln Gly Pro Val Leu Leu Ser
385 390 395 400

Asp Glu Ser Gln Ala Leu Leu Ser Pro Glu Thr Gly Leu Pro Lys
405 410 415

<210> 14

<211> 232

<212> PRT

<213> Hevea brasiliensis

<400> 14

Met Ala Pro Ala Ala Ala Thr Ala Val Ala Ala Glu Ile Lys Pro Arg
1 5 10 15

Asp Val Cys Ile Val Gly Val Ala Arg Thr Pro Met Gly Gly Phe Leu
20 25 30

Gly Ser Leu Cys Thr Leu Ser Ala Thr Lys Leu Gly Ser Ile Ala Ile
35 40 45

Glu Ala Ala Leu Lys Arg Ala Asn Val Asp Pro Ser Leu Val Gln Glu
50 55 60

Val Phe Phe Gly Asn Val Leu Ser Ala Asn Leu Gly Gln Ala Pro Ala
65 70 75 80

Arg Gln Ala Ala Leu Gly Ala Gly Ile Pro Asn Ser Val Val Cys Thr
85 90 95

Thr Val Asn Lys Val Cys Ala Ser Gly Met Lys Ala Thr Met Leu Ala
100 105 110

Ala Gln Ser Ile Gln Leu Gly Ile Asn Asp Val Val Val Ala Gly Gly
115 120 125

Met Glu Ser Met Ser Asn Ala Pro Lys Tyr Leu Ala Glu Ala Arg Lys
130 135 140

Gly Ser Arg Leu Gly His Asp Ser Leu Val Asp Gly Met Leu Lys Asp
145 150 155 160

Gly Leu Trp Asp Val Tyr Asn Asp Val Gly Met Gly Ser Cys Ala Glu
165 170 175

Ile Cys Ala Asp Asn His Ser Ile Thr Arg Glu Asp Gln Asp Lys Phe
180 185 190

Ala Ile His Ser Phe Glu Arg Gly Ile Ala Ala Gln Glu Ser Gly Ala
195 200 205

Phe Ala Trp Glu Ile Val Pro Val Glu Val Ser Lys Gly Gln Gly Gly
210 215 220

Asn Tyr Asp Trp His Val Gly Cys
225 230

<210> 15

<211> 25

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> primer

<400> 15

acctacaaca aagctctcat caacc

25

<210> 16

<211> 25

<212> DNA

<213> Artificial Sequence

<400> 16

gcaatgtaac atcagagatt ttgag

25

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